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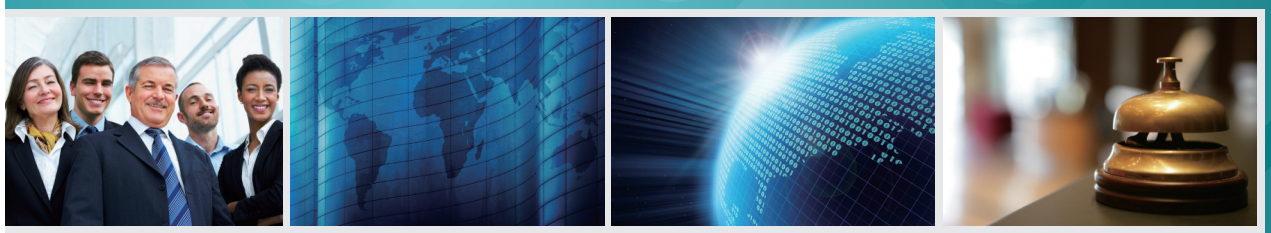

LEC-7920 Preliminary

User's Manual

Publication date:2012-01-17

About

Overview

Icon Descriptions

The icons are used in the manual to serve as an indication of interest topics or important messages. Below is a description of these icons:

NOTE: This check mark indicates that there is a note of interest and is something that you should pay special attention to while using the product.

WARNING: This exclamation point indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

The listed websites are links to the on-line product information and technical support.

Resource	Website
Lanner	http://www.lannerinc.com
Product Resources	http://assist.lannerinc.com
RMA	http://eRMA.lannerinc.com

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Compliances and Certification

CE Certification

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A Certification

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Chapter 1: Introduction

Thank you for choosing the LEC-7920. The LEC-7920 features Intel i5/i7 and Celeron processors. It has dual LAN as well as DVI-I and DVI-D connectors for high demand of Internet and video playback applications.

The following highlight the capabilities of the LEC-7920 system:

- Intel HD Graphics Engine
- Dual DVI-I and DVI-D video out
- Dual 10/100/1000 Mbps LAN
- USB x 6 (4 external USB ports and 2 internal header) and Digital Input/Output x 1
- SATA HDD support
- Power-on switch through the Phoenix connector for distant control
- 2 RS232 serial ports support Hardware Auto-flow Control
- Audio input and output through Mic-in and Line-out jack
- Aluminum extrusion enclosure which helps heat dissipation
- Fanless design which can sustain the operating temperature from 14-131°F

System Specifications

Dimension (WxHxD)		**277x67x190mm (10.91"x2.64"x7.48")**
Processor		Intel i7/i5/Celeron
Chipset		**Intel HM55**
System Memory	Technology	DDR3 SO-DIMM x 2
	Max. Capacity	8GB
Storage	IDE	**N/A**
	SATA	**2.5" HDD/SSD drive bay x 1 SATA-DOM x 1**
Ethernet Controller		Intel 82574L x 2
Graphic Controller		**Intel® GMA HD Graphics Engine**
Audio Controller		Phone Jack x 2 for Mic-In and Line-Out
I/O	LAN	**GbE RJ45 x 2**
	Display	**DVI-I x 1, DVI-D x 1**
	Video Grabber	**No**
	Audio	**Phone Jack x 2 for Mic-In & Line-Out**
	Serial I/O	**DB9 x2 for RS232**
	GPS	**No**
	Digital I/O	**DB9 Female x 1 for DI x 4 & DO x 4 (5V TTL)**
	USB 2.0	**Type A x 4; Internal x 2**
	Power Input	**Power Jack w/ Lock**
	Expansion	**Mini-PCIe x 1 with SIM Card Reader**
Power Input		12 Vdc ATX Mode
AC Adapter		**75W + 19V @ 3.95A**
Hardware Monitor	Fintek F81865 integrated Watchdog Timer 1~255 level	
OS Support	**Linux, XPE/WES2009, XP Pro FES, WS7E, WS7Pro-E**	

Operating Temperature Range with Commercial Components:
(Industrial Memory, CF, HDD, SSD) -20~55°C / 14-131°F

Operating Temperature Range with Industrial Components:
(Industrial Memory, CF, HDD, SSD) -20~55°C / 14-131°F

Chapter 1

Introduction

Package Contents

Your package contains the following items:

- LEC-7920 Fanless Embedded System
- Power Adapter (P/N: 0P0W075122001)
- Wall-Mounting Kit (P/N: SE9ESA900R100)
- Drivers and User's Manual CD (S09OADA15H100)
- 2-pin Female Terminal Block (P/N: 04AW20023Z101)

Optional Accessories

The system has a variety of optional accessories including the power cords and Wi-Fi or 3G modules for extended capabilities. For details of these modules, visit:

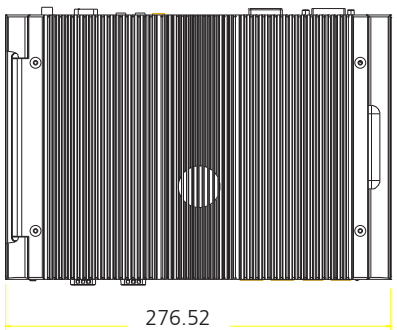
http://www.lannerinc.com/Embedded_Computing/LEC-7920

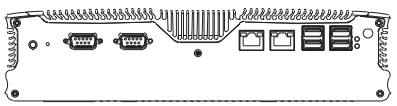
Chapter 2: System Components

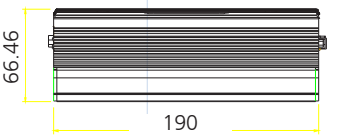
System Drawing

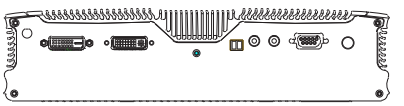
Mechanical dimensions of the LEC-7920

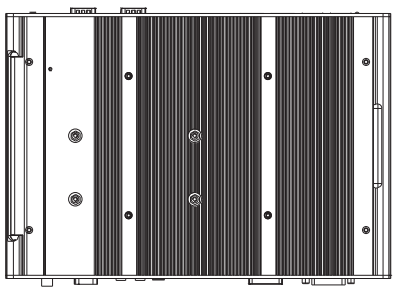
Unit: mm





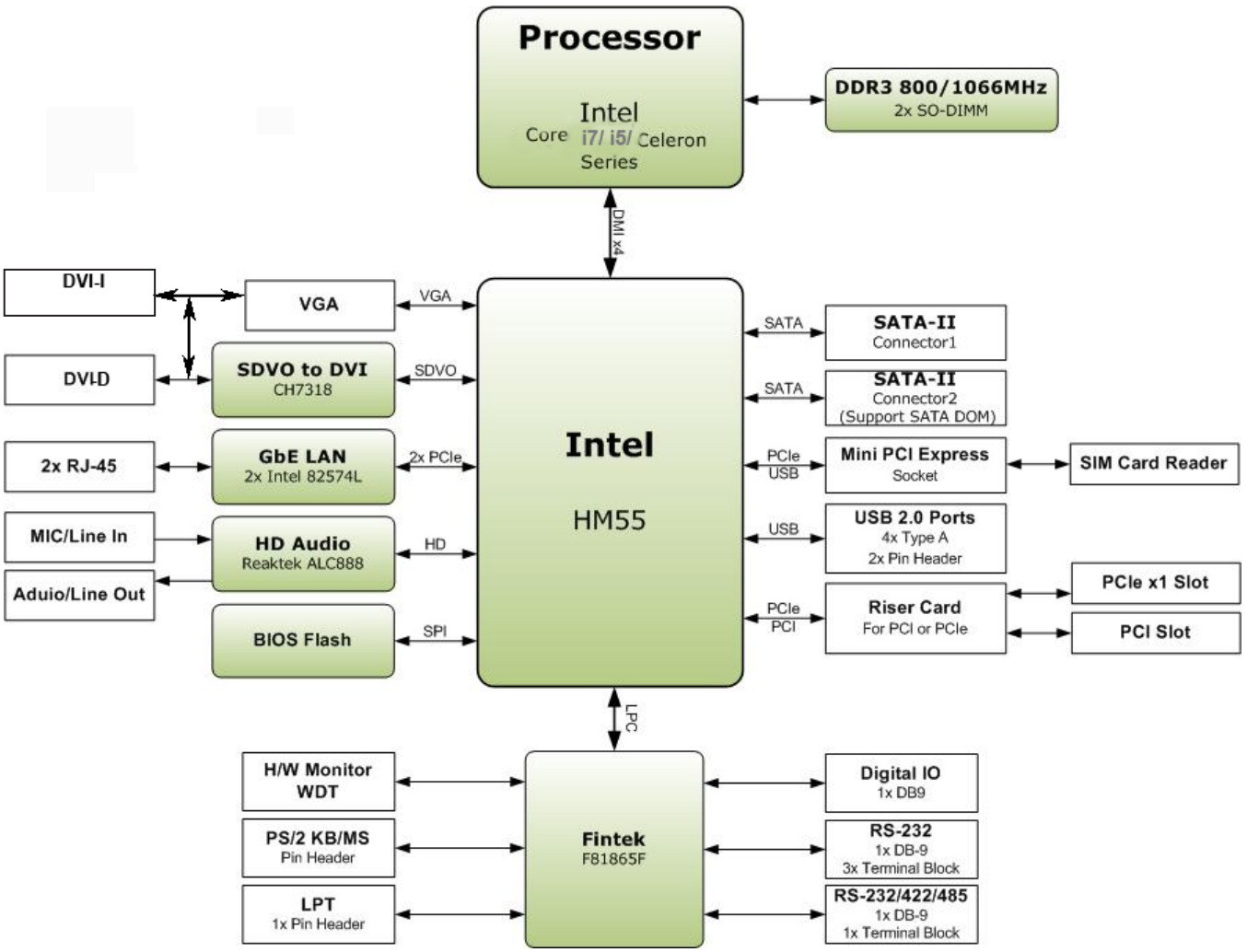






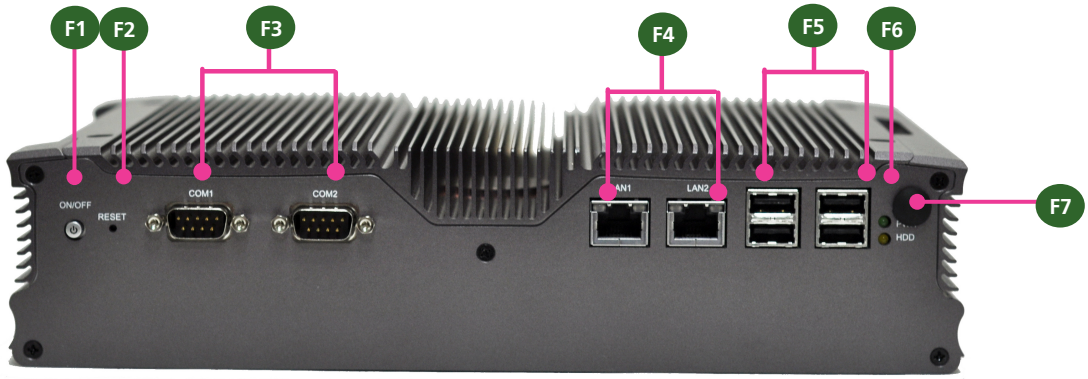
Block Diagram

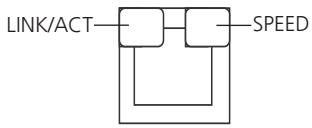
The block diagram depicts the relationships among the interfaces and modules on the motherboard..



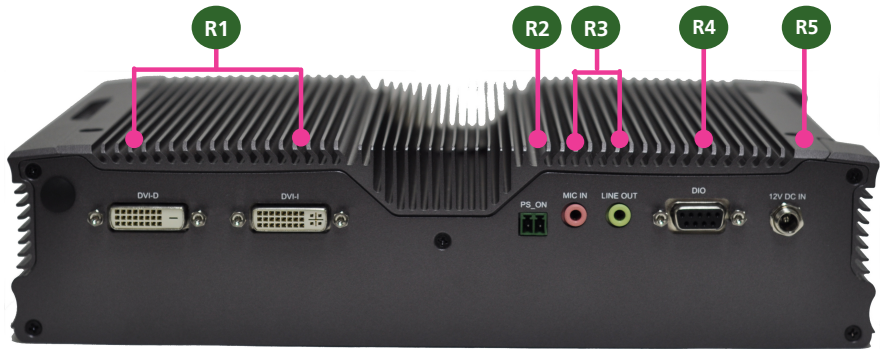
Chapter 2

Front Components



Component	Description	Pin Definition Reference
F1 Power Button with dual LED	ATX Power-on button with LEDs: Standby mode in Red; Power-on mode in Green	
F2 Reset	Reset switch	SW9 on page 16
F3 Serial Ports	Serial ports through the DB-9 connector; COM1 and COM2 support RS-232 data communication.	CN15, CN16 on page 14
F4 Two 10/100/1000Mbps LAN ports  	Two RJ-45 (network) jacks with LED indicators as described below. The LAN ports are provided by Intel 82574L. They both support WOL/Remote-wake-up/PXE function. LINK/ACT (Yellow) • On/Flashing: The port is linking and active in data transmission. • Off: The port is not linking. SPEED (Green/Amber) • Amber: The connection speed is 1000Mbps. • Green: The connection speed is 100Mbps • Off: .The connection speed is 10Mbps.	LAN Ports (CN13/CN14) on page 15
F5 Four USB 2.0 Ports	An USB type A connector. In addition to this connector, an internal pin header is easily access from the back compartment.	Dual USB Port Connectors (USB1, USB2) on Page 15
F6 HDD (Yellow) and Power LED (Green)	HDD • Blinking: data access activities • Off: no SATA disk present or no data access activities Power • On: The computer is on. • Off: The computer is off .	
F7 Antenna Hole	Reserved for antenna	

Rear Components

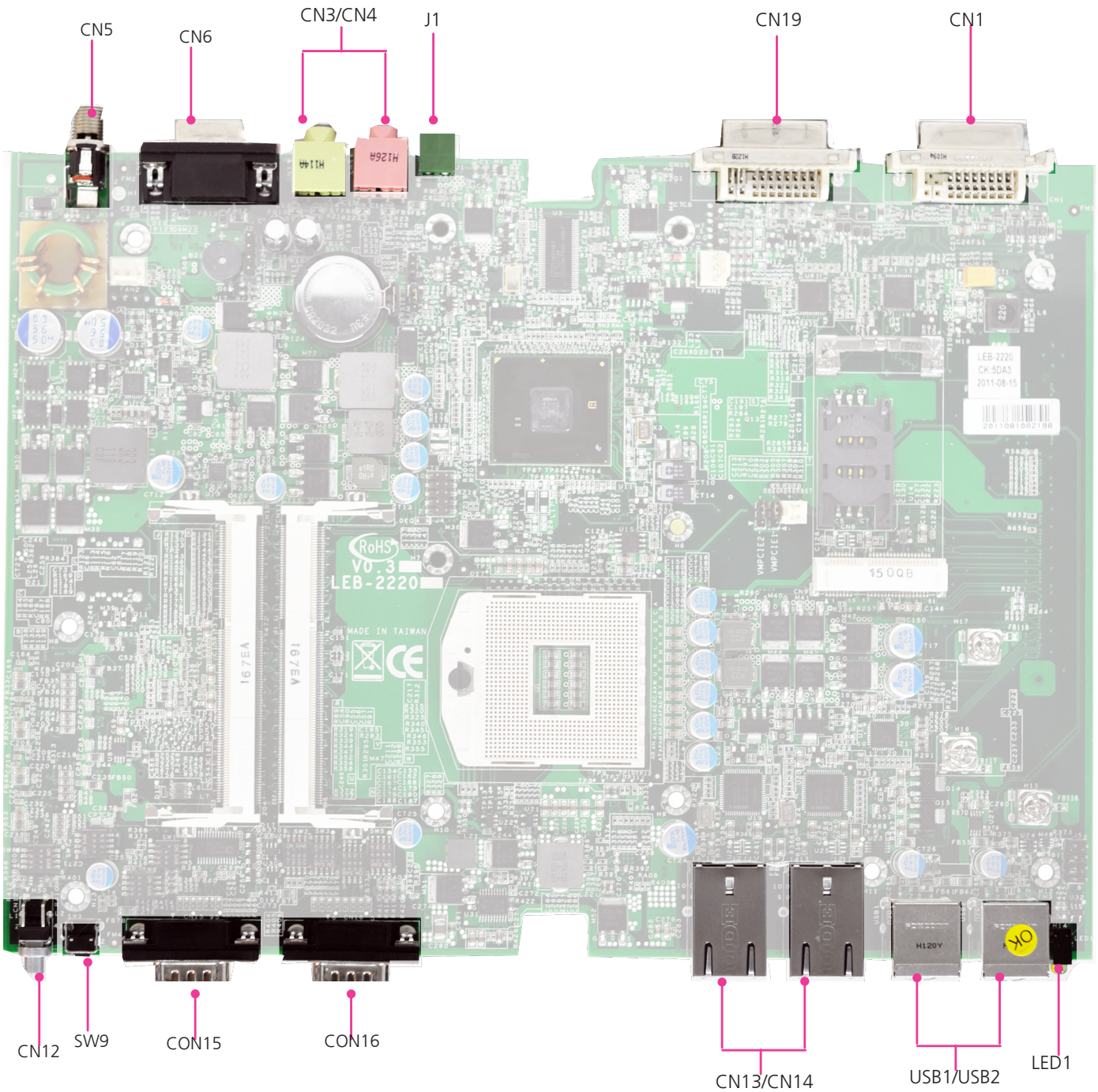


Component	Description	Pin Definition Reference
R1 DVI-I, DVI-D	Dual display with the DVI and DVI-D ports (single link) which are provided by Intel HD Graphic Engine through the Chrontel's CH7318 SDVO to DVI converter. The display DVI-I/ DVI-D can support Analog up to 1920x1080 @ 60 Hz and Flat panels up to 1920x1080 @ 60 Hz	DVI-D/DVI-I Connectors on page 16
R2 Power-on Switch	A power-on switch through the Phoenix contact for distant power-on/off control	J1 on page 15
R3 MIC IN LINE OUT	Connect the audio devices to these ports. The Microphone and line out port are provided by Realtek ALC888S	CN3, CN4 on page 16
R4 DIO Port	The DIO port provides 4 digital input and 4 digital output ports.	CN6 on page 15
R5 DC-In (power) Connector	Power-in Connector. The LEC-7920 supports screw-locked power plug which allows secure power connection.	DC_IN Connector (CN5) on page 17

Chapter 3: Board Layout

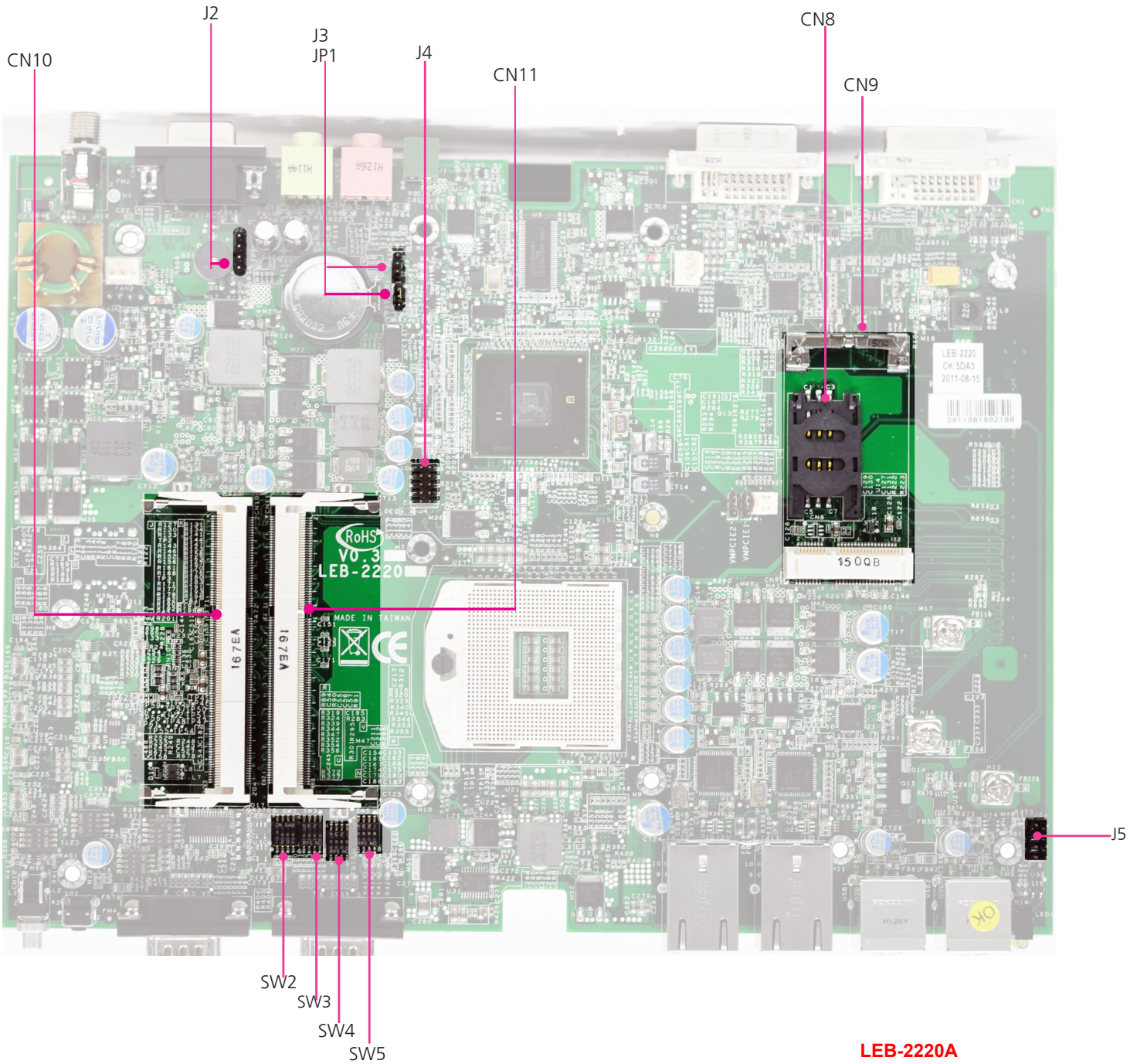
External Connectors

The following picture highlights the location of system input/output connectors. Refer to the table 3.1 Connector List for more details.



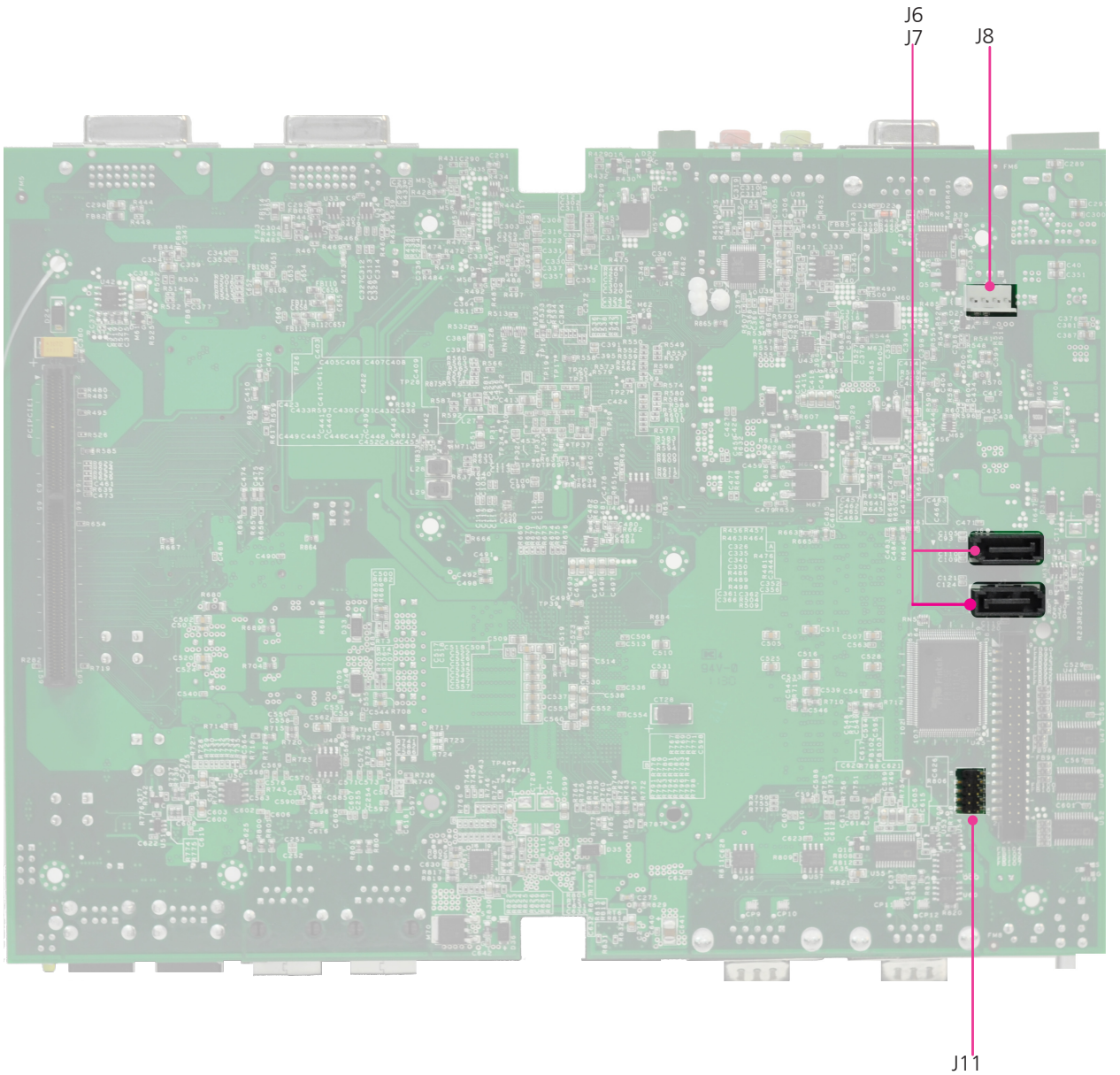
Internal Connectors and Jumpers

The following picture highlights the location of internal connectors and jumpers. Refer to the table 3.1 Connector List for more details.



Internal Connectors and Jumpers (backside)

The following picture highlights the location of internal connectors and jumpers on the backside of the board. Refer to the table 3.1 Connector List for more details.



Chapter 3

Connectors and Jumpers List

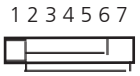
The tables below list the function of each of the board jumpers and connectors by labels shown in the above section. The next section in this chapter gives pin definitions and instructions on setting jumpers.

Table 3.1 Connector List for **LEB-2220A**

Labels	**Function**	**Pin Definition Reference Page**
CN1	DVI-D Connector	P16
CN3	Audio Output	P16
CN4	MIC Input	P16
CN5	DC-in Connector	P17
CN6	Digital Input/Output	P15
CN8	SIM Card Reader	P15
CN9	MINI-PCIE	P16
CN10/CN11	DDR3-DIMM1/DDR3-DIMM2	--
CN12	Power Button	--
CN13	LAN1	P15
CN14	LAN2	P15
CN15	COM1	P14
CN16	COM2	P14
CN19	DVI-I	P16
JP1	CMOS	P15
J1	External Power Button	P15
J2	LINE-IN	P16
J3	SM-BUS	Reserved for factory use
J4	SPI-ROM	Reserved for factory use
J5	Miscellaneous Front Panel Functions	P15
J6	Serial-ATA Connector	P14
J7	Serial-ATA Connector	P14
J8	SATA Power	P14
J11	USB4, USB5	P15
USB1	USB0, USB1	P15
USB2	USB2, USB3	P15
SW9	Reset Button	P16
SW2/SW3/SW4SW5	Reserved for Factory use	Reserved for factory use

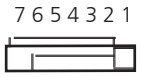
Jumper Settings

Serial-ATA Connector (J6): It is for connecting a 2.5" harddisk to be served as your system's storage. It can support SATA II which features Data transfer rates up to 3.0 Gb/s (300 MB/s).



Pin No.	Function
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Serial-ATA Connector (J7): This connector supports SATA-DOM.

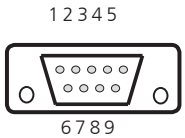


Pin No.	Function
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	VCC_5V

4-pin Serial-ATA Power Connector (J8): It is for connecting the SATA power cord.

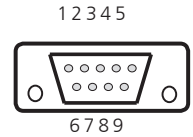
Pin No.	Function
1	+12V
2	GND
3	GND
4	+5V

RS-232 Serial Port(COM1, CN15): It is a RS-232 port through the D-SUB9 connector.



Pin No.	Pin Name	Pin No.	Pin Name
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RIA
5	GND		

RS-232 Serial Port(COM2, CN16): It is a RS-232 port through the D-SUB9 connector.

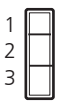


Pin No.	Pin Name	Pin No.	Pin Name
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RIA
5	GND		

LAN1/LAN2 Ports (CN13/CN14): The LAN ports are provided by Intel 82574L Ethernet controller whose interface complies with PCI-e 1.1 (2.5 Ghz). It has advanced management features including IPMI pass-through via SMBus or NC-SI, WOL, PXE remote boot, ISCSI boot and VLAN filtering.

Pin No.	Description	
	Fast Ethernet	Gigabit Ethernet
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-

Clear CMOS jumper (JP1): It is for clearing the CMOS memory.



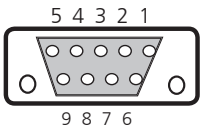
Pin No.	Pin Name
1-2	Normal (Default)
2-3	Clear CMOS

Digital I/O (CN6)

Digital IN/OUT(DIO1) Connector: The 8 pins of General Purpose Input/Output (GPIO) support input and output operations through the DB-9 female connector.

TTL Level is +5V; Maximum input/output current for each port is 50mA			
Input/Output	Voltage	Logic	Register
	0~2V	Low	0
	2~5V	High	1
The default value is 0			

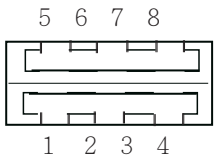
DIO Address			
Address	Description	Address	Description
0x2e	SUPERIO_INDEX	0x08	GPIO3
0x2f	SUPERIO_DATA	0x10	GPIO4
0x07	BANK_REG	0x20	GPIO5
0x01	GPIO0	0x40	GPIO6
0x02	GPIO1	0x80	GPIO7
0x04	GPIO2		



Pin No.	Pin Name	Pin No.	Pin Name
1	Input0	6	Output0
2	Input1	7	Output1
3	Input2	8	Output2
4	Input3	9	Output3
5	GND		

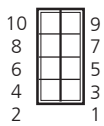
Dual USB Port Connector #0 and #1 (USB1):

Dual USB Port Connector #2 and #3 (USB2)



Pin No.	Function
1	+5V
2	USBD0-
3	USBD0+
4	GND
5	+5v
6	USBD1-
7	USBD1+
8	GND

USB 2.0 Pin Header (J11, USB#4 and #5):

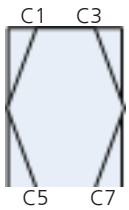


Pin No.	Pin Name	Pin No.	Pin Name
1	+5V	2	+5V
3	USBD4-	4	USBD5-
5	USBD4+	6	USBD5+
7	Ground	8	Ground
		10	NC

External Power Button (J1):

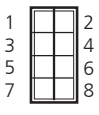
PIN NO.	DESCRIPTION
1	PWR_BTN_N
2	GND

SIM Card Socket (CN8):



Pin No.	Description
C1	UIM_PWR
C2	USIM_RESET
C3	USIM_CLK
C5	GND
C6	USIM_VPP
C7	USIM_DATA

Front Panel Function Pin Header (J5, on the backside): It provides LED signal and button function on the front panel.



Pin No.	Pin Name	Function	Pin No.	Pin Name	Function
1	HD_LED+	HDD LED	2	PWR_LED+	Power LED
3	HD_LED-		4	PWR_LED-	
5	Reset	System Reset Button	6	POWER_BTN-	Power On/Off Push Button
7	GND		8	GND	

Mini PCI Express Connector (CN9):

PIN	Pin Name	PIN	Pin Name
1	WAKE#	27	GND
2	+3.3V	28	+1.5V
3	Reserved	29	GND
4	GND	30	SMB_CLK
5	Reserved	31	PETn0
6	1.5V	32	SMB_DATA
7	CLKREQ#	33	PETp0
8	RESERVED	34	GND
9	GND	35	GND
10	RESERVED	36	USB_D-
11	REFCLK-	37	RSVERD
12	RESERVED	38	USB_D+
13	REFCLK+	39	RSVERD
14	RESERVED	40	GND
15	GND	41	RESERVED
16	RESERVED	42	RESERVED
17	RESERVED (UIM_C8)	43	RESERVED
18	GND	44	RESERVED
19	RESERVED (UIM_C4)	45	RESERVED
20	ENABLE	46	RESERVED
21	GND	47	RESERVED
22	PERST#	48	+1.5V
23	PERn0	49	RESERVED
24	+3.3Vaux	50	GND
25	PERp0	51	RESERVED
26	GND	52	+3.3V

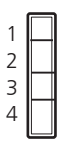
Audio Output (CN3)

Pin No.	Description
1,3	GND
2	AUDIO_OUT_L
4	AUDIO_JD
5	AUDIO_OUT_R

Microphone Input (CN4)

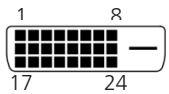
Pin No.	Description
1,3	GND
2	MIC_OUT_L
4	MIC_JD
5	MIC_OUT_R

Line-in (J2)



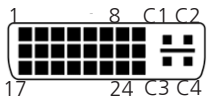
Pin No.	Description
1	LINE_OUT-R
2	LINE_JD
3	LINE_OUT-L
4	GND

DVI-D Connector (CN1): A single link DVI-D Connector



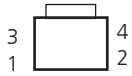
Pin No.	Description	Pin No.	Description
1	DATA2-	2	DATA2+
3	GND	4	NC
5	NC	6	DDC_CLK
7	DDC_DAT	8	NC
9	DATA1-	10	DATA1+
11	GND	12	NC
13	NC	14	+5V
15	GND	16	HPD
17	DATA0-	18	DATA0+
19	GND	20	NC
21	NC	22	GND
23	CLK+	24	CLK-

DVI-I Connector (CN19): A single link DVI-D Connector



Pin No.	Description	Pin No.	Description
1	DATA2-	2	DATA2+
3	GND	4	NC
5	NC	6	DDC_CLK
7	DDC_DAT	8	NC
9	DATA1-	10	DATA1+
11	GND	12	NC
13	NC	14	+5V
15	GND	16	HPD
17	DATA0-	18	DATA0+
19	GND	20	NC
21	NC	22	GND
23	CLK_P	24	CLK_N

Reset Button (SW9)



Pin NO.	Description
1	RST_BTN_N
2	GND
3	N.C.
4	GND

DC_IN CONNECTOR (CN5): DC power connector

Pin No.	Pin Name
1	12V-IN
2	GND
3	GND

Chapter 4: Hardware Setup

Preparing the Hardware Installation

To access some components and perform certain service procedures, you must perform the following procedures first.

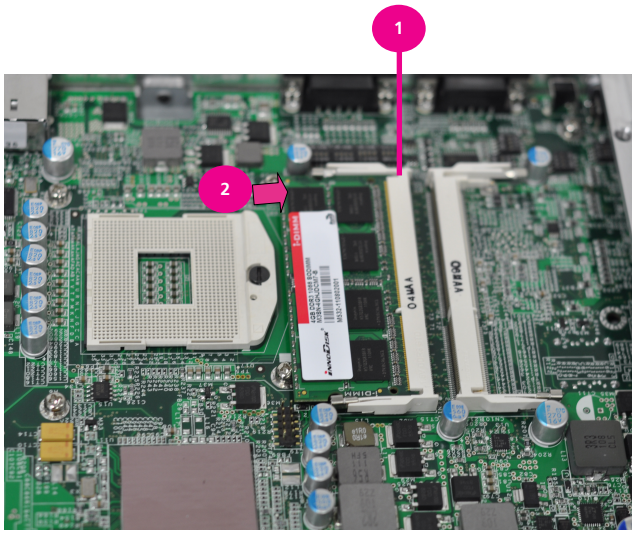
WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The power switch button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until power is removed.

1. Unpower the LEC-7920 and remove the power cord.
2. Turn the device upside down.
3. Unscrew the 4 rubber feet from the bottom cover.
4. Open the cover.

Installing the System Memory

The motherboard supports DDR3 memory to meet the higher bandwidth requirements of the latest operating system and Internet applications. It comes with two Double Data Rate Three (DDR3) Small Outline Dual Inline Memory Module (SO-DIMM) socket.

1. Align the memory module's cutout with the SO-DIMM socket's notch.
2. Install the SO-DIMM.



Note:

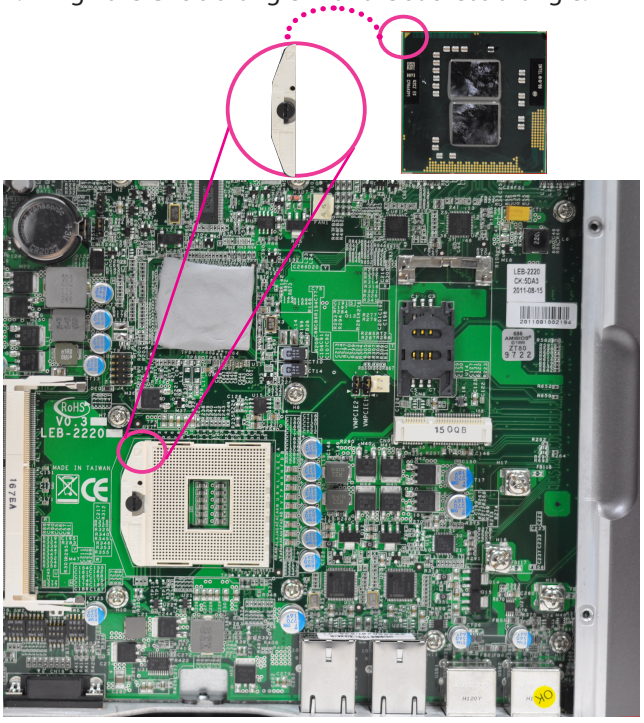
The system can support memory of DDR3 SO-DIMM up to 8 GB in maximum.

Installing the CPU

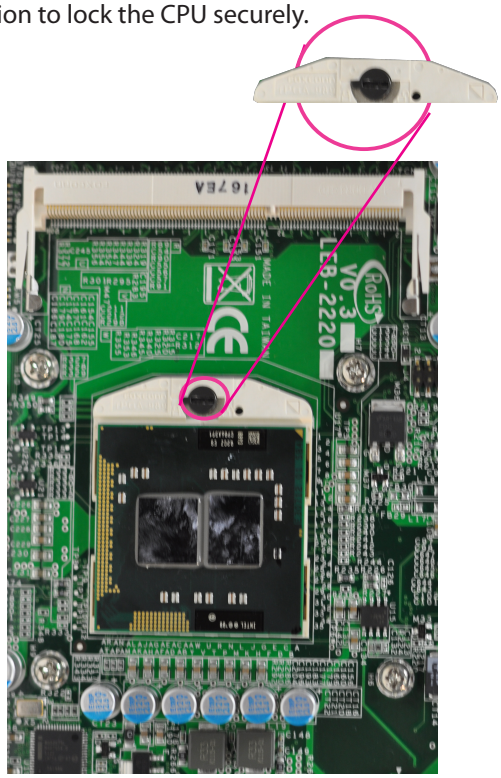
The system supports Intel CPU i5, i7 and Celeron P4500 processor which should be installed on the motherboard's micro-PGA 989 socket.

To install the CPU to the socket, follow these steps:

1. Align the CPU's triangle with the socket's triangle.



2. Place the CPU inside the socket and turn the knob all the way until it is horizontally opposite to its original position to lock the CPU securely.



Note:

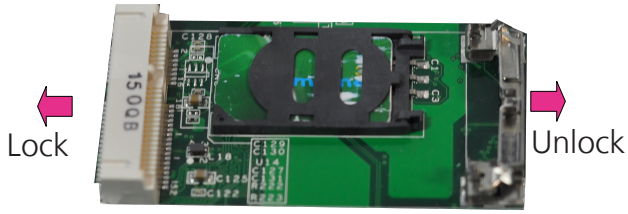
If the CPU thermal pad mounting breaks apart, use your hands to reattach the falling parts and stick them together.

Wireless Module Installation

1. Align the wireless module's cutout with the Mini-PCIe slot notch.
2. Insert the wireless module into the connector diagonally.
3. Push the other end of the wireless module to be tightened with the latch.

3G SIM Card Installation

1. Unlink the SIM card reader first by sliding it outward.
2. Flip the SIM card reader diagonally.
3. Align the cut corner of the SIM card with the cut corner of the SIM card reader. Make sure the ICs will be in contact with the SIM card reader.
4. Insert the SIM card into the reader and close the tray. You should feel a click when the SIM card is locked securely in the SIM card reader.

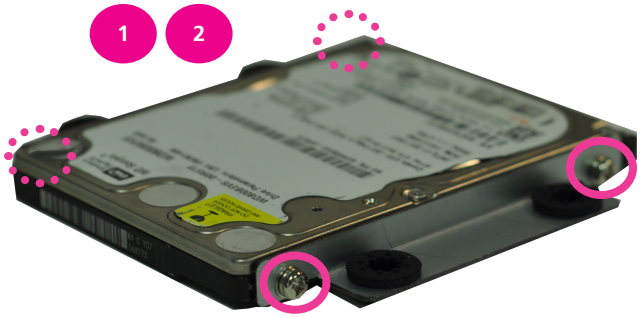


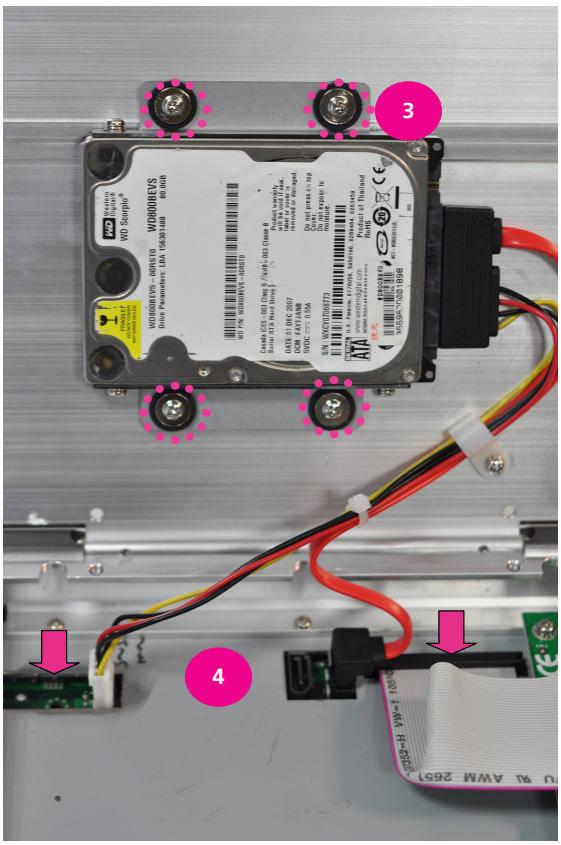
Note: To remove the SIM card, push the card outward to unlock it.

Installing the Hard Disk

The system can accommodate one Serial-ATA disk. Follow these steps to install a hard disk into the system:

1. Take out the hard disk tray and fix the hard disk on the tray with 4 mounting screws as illustrated in the following picture.
2. Plug the Serial-ATA cable to the hard disk.
3. Place the hard disk back to the system's chassis and fix it with the mounting screws.
4. Connect the Serial-ATA power and data disk cables to the Serial-ATA power and disk connectors on the main board respectively.





Wall Mounting

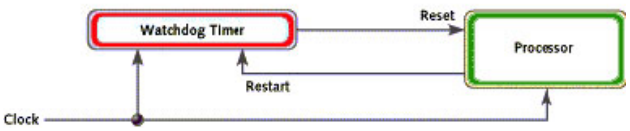
The product ships with wall mounting kit. To mount your product on the wall, follow the instructions below:

1. First make a hole for the anchor in the surface on the wall. Use the following diagram as a guideline for placing the anchors.
2. Then press the anchor into the hole until it is flush with the surface. You may need a hammer to tap the wall anchor.
3. Use a screwdriver to screw the threaded screw into the plastic anchor.
4. Attach the wall mounting bracket to the back of the device, securing it in place with four of the flat-head screws provided.
5. Hang the device on the wall.

Appendix A: Programming Watchdog Timer

A watchdog timer is a piece of hardware that can be used to automatically detect system anomalies and reset the processor in case there are any problems. Generally speaking, a watchdog timer is based on a counter that counts down from an initial value to zero. The software selects the counter's initial value and periodically restarts it. Should the counter reach zero before the software restarts it, the software is presumed to be malfunctioning and the processor's reset signal is asserted. Thus, the processor will be restarted as if a human operator had cycled the power.

For sample watchdog code, see *Watch dog and DIO* folder in the *Driver and Manual CD*



Driver Installation

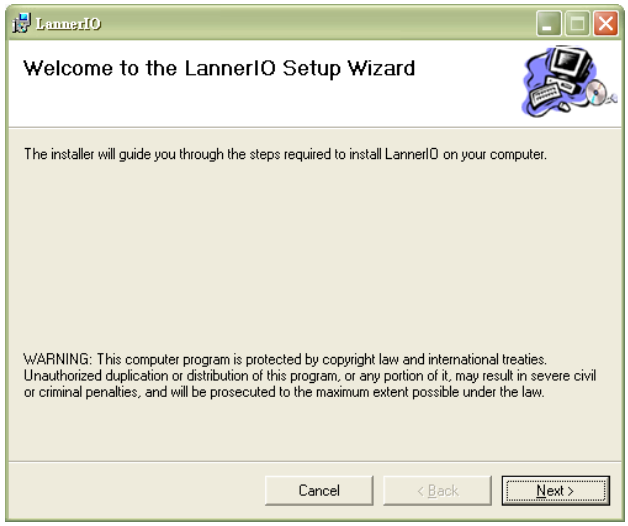
Before you could access or control the operation of the watchdog and Digital I/O functions, install the the L_IO driver which is the library and driver needed for Lanner General Purpose Input/Output interface or functions.

To install the L_IO driver:

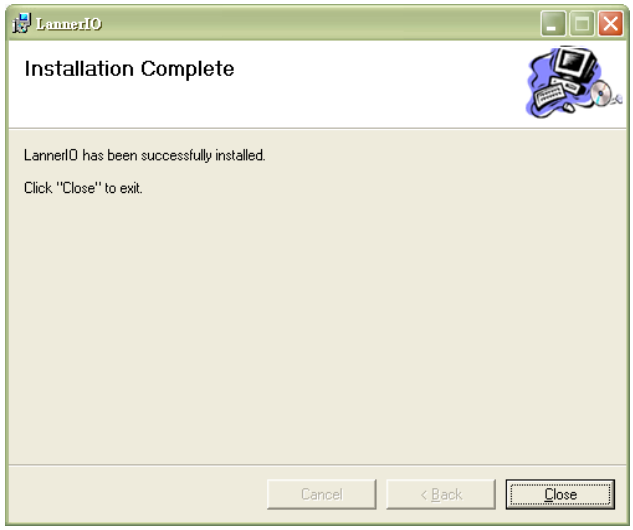
1. Restart the computer, and then log on with Administrator privilege.
2. Insert the Drivers and User's Manual CD to the USB-optical drive.
3. Browse the contents of the support CD to locate the file LannerIO v101.rar under the \WD_DIO\ folder and unzip the file.
4. Click the Setup program in the unzipped folder.

1. Click the Setup program.

2. The welcome screen appears. Click Next to proceed.

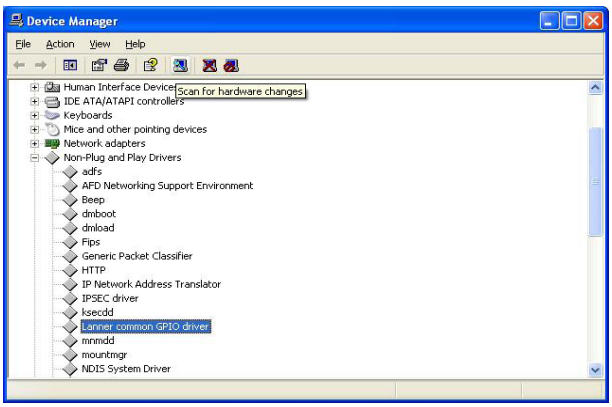

LannerIO
Welcome to the LannerIO Setup Wizard
The installer will guide you through the steps required to install LannerIO on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

3. The installation process proceeds. Click Close when the process completes.



To verify the GPIO driver installation, do the following steps:

1. Right-click on the My Computer icon, and then select Properties form the menu.
2. Click the Hardware tab, then click the Device Manager button.
3. Select *View* from the menu and select *show hidden devices* .
4. The Lanner common GPIO driver should be listed under the Non-Plug and Play Drivers. If not, click the *San for hardware changes* button from the tool bar.



Sample Program

You can write your own program by modifying the source code F81865_Test.cpp.. The index address is 2EH.

```
////////////////////////////////////////////////////////////////////////////
// F81865_Test.cpp : F81865_test.exe utility for F81865.lib APIs demonstration.
//
// History:
//      7/15/2011       Brand new F81865_test program.



#include <winsock2.h>
#include "Windows.h"
#include "stdio.h"
#include "F81865.h"



#define PARAMETER_HELP                  "\n"\
                "The F81865 GPIO utility of Lanner\n"\
                "-------------------------------------\n"\
                "Usage:\n"\
                    " F81865_test  DIO_IN           port_number\n"\
                " F81865_test DIO_OUT       port_number value\n"\
                 " F81865_test  PIO             port_number value\n"\
                " F81865_test RunLED        port_number value\n"\
                " F81865_test AlarmLED      port_number value\n"\
                 " F81865_test GPS_LED      port_number value\n"\
                " F81865_test WirelessLED   port_number value\n"\

" F81865_test WatchDog          seconds\n"\

" F81865_test CaseOpen\n"\

" F81865_test CaseOpen_Clear\n"\
```

```
                                    " F81865_test Sleep
milliseconds\n"\
                "\n"\

"Argement:\n"\
                  " DIO_IN          Read state from DIO
In.\n"\
                " DIO_OUT         Set DIO Out state.\n"\
                " PIO             Set PIO LED state.\n"\
                " RunLED          Set RUN LED state.\n"\

" AlarmLED        Set Alarm LED state.\n"\

" GPS_LED         Set GPS LED state.\n"\

" WirelessLED     Set Wireless LED state.\n"\

          " Watchdog                          Set
Watchdog timer.\n"\

" CaseOpen        Check case opened state.\n"\

" CaseOpen_Clear  Clear case open state.\n"\
                " port_number     The port number.\n"\
                " value           1 for on and 0 for off.\n"\
                " seconds                     The
watchdog count down seconds. 0 for disable.\n"\
                  " milliseconds      Milliseconds to
delay\n"


#define RETMSG(a,b) {printf (b) ; return a;}

#define CHECK_ARGC(a) {if (argc
!= a) throw PARAMETER_HELP ;}


// Translate Hex string to a long value
LONG Hex2Long (char *str)
{
        LONG nLong ;

        if (scanf (str, "%x", &nLong) != 1)
                throw "Error parsing parameter\n" ;

        return nLong ;
}
```

```
// Make sure the argument is numeric
void CheckNumeric (char *szBuf)
{
        int nLen = strlen (szBuf) ;

        for (int i = 0 ; i < nLen ; i++)
      if (!strchr ("01234567890ABCDEFabcdef", szBuf[i]) )
                throw "Wrong argument\n" ;
}


// Common GPIO output function definition
#define GPIO_OUT(a,b,c)                         \
int a (int argc, char *argv[])                  \
{                                               \
        CHECK_ARGC (4) ;
\
        CheckNumeric (argv[2]) ;                \
        CheckNumeric (argv[3]) ;                \

                \
        int nPort  = atoi (argv[2]) ;\
        int nValue = atoi (argv[3]) ;           \

                \
        c (nPort, nValue) ;
\

                \
        printf (b " #%d = %d\n", nPort, nValue) ;       \

                \
        return 0
;                                               \
}


// Function generate by common function definition
GPIO_OUT (mDIO_
OUT , "DIO_OUT" , Write_DIO)
G P I O _ O U T
(mPIO , "DIO_OUT" , PIO)
G P I O _ O U T
(mRunLED , "RunLED" , RunLED)
G P I O _ O U T
(mAlarmLED , "AlarmLED" , AlarmLED)
GPIO_OUT (mGPS_
LED , "GPS_LED" , GPS_LED)
```

```
GPIO_OUT (mWirelessLED ,"WirelessLED" , WirelessLED)


// Check case open
int mCaseOpen  (int argc, char* argv[])
{
        CHECK_ARGC (2) ;

        BOOL bOpen = CaseOpen () ;
        printf ("Case is %s\n", bOpen ? "Open" : "Close") ;

        return bOpen ;
}


// Clear case open state
int mCaseOpen_Clear  (int argc, char* argv[])
{
        CHECK_ARGC (2) ;

        CaseOpen_Clear () ;

        BOOL bOpen = CaseOpen () ;

        printf ("CaseOpen state %s", bOpen ? "not cleared"
: "cleared") ;

        return bOpen ;
}


// Get DIO_IN state
int mDIO_IN (int argc, char* argv[])
{
        CHECK_ARGC (3) ;
        CheckNumeric (argv[2]) ;

        int  nPort = atoi (argv[2]) ;
        BOOL ret   = Read_DIO (nPort) ;

        printf ("DIO_IN #%d = %d\n", nPort, ret) ;

        return ret ;
}


// Milli-second delay
int mSleep (int argc, char *argv[])
{
        CHECK_ARGC (3) ;

        CheckNumeric (argv[2]) ;

   Sleep (atoi (argv[2]) ) ;

        return 0 ;
}


// Watchdog
int mWatchDog (int argc, char *argv[])
{
        if (argc != 3 && argc != 2)
                RETMSG (-1, PARAMETER_HELP) ;

        if (argc == 3)
        {
                CheckNumeric (argv[2]) ;

                int nValue = atoi (argv[2])  ;

                WatchDog_Enable (nValue) ;
        }

        int nLeft = WatchDog_GetLeft () ;

        printf ("Watchdog timer left %d seconds\n", nLeft)
;
```

```
        return nLeft ;
}


// Argument - function mapping
typedef struct
{
        char *szCmd ;
        int (*function) (int argc, char *argv[]) ;

} CMD2FUN ;


CMD2FUN c2f[] =
{
        {"DIO_IN"               , mDIO_IN
},
        {"DIO_OUT"              , mDIO_OUT
},
        {"PIO"                  , mPIO
},
        {"RunLED"               , mRunLED
},
        {"AlarmLED"             , mAlarmLED
},
        {"GPS_LED"              , mGPS_LED
},
        {"WirelessLED"  , mWirelessLED  },
        {"CaseOpen"     , mCaseOpen     },
        {"CaseOpen_Clear",mCaseOpen_Clear},
        {"Watchdog"             , mWatchDog
},
        {"Sleep"        , mSleep        }
} ;


// Program start here
int main(int argc, char *argv[])
{
        try
        {
                // The total argument allowed
                int num = sizeof (c2f) / sizeof (c2f[0]) ;


                // Too few argument
                if (argc < 2)
                        RETMSG (-1, PARAMETER_HELP)
;

                // Find the match argument and execute
the mapping function
                for (int i = 0 ; i < num ; i++)
                        if (stricmp (argv[1], c2f[i].szCmd)
== 0)
                                return  c2f[i].function
(argc, argv) ;

                // No match argument
                RETMSG (-1, "Wrong Argument\n") ;
        }
        catch (char *str)
        {
                // Output the error message
                printf ("\n%s\n", str) ;
        }
        catch (...)
        {
                // Unknown exception
                printf ("\nUnknown Exception\n") ;
        }

  return -1 ;
}
```

Appendix B: Digital Input/Output Control on the GPIO port

The Digitanl I/O on the panel is designed to provide the input and output operations for the system. For sample DIO code, see *Watch dog and DIO* in the *Driver and Manual CD*.

Driver Installation

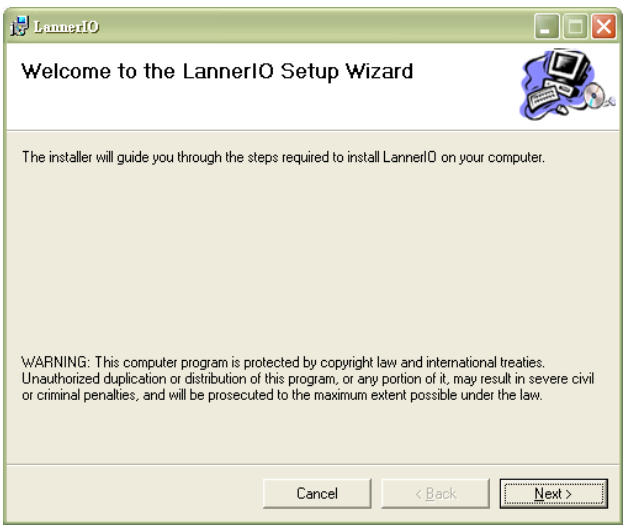
Before you could access or control the operation of the watchdog and Digital I/O functions, install the the L_IO driver which is the library and driver needed for Lanner General Purpose Input/Output interface or functions.

To install the L_IO driver:

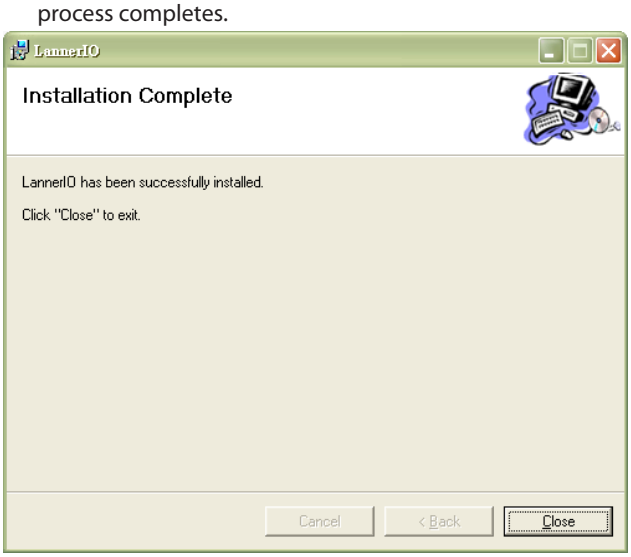
1. Restart the computer, and then log on with Administrator privilege.
2. Insert the Drivers and User's Manual CD to the USB-optical drive.
3. Browse the contents of the support CD to locate the file LIO.rar under the \Watch dog and DIO\LIO folder and unzip the file.
4. From the control panel, click the ADD Hardware program

1. Click the Setup program.

2. The welcome screen appears. Click Next to proceed.


LannerIO
Welcome to the LannerIO Setup Wizard
The installer will guide you through the steps required to install LannerIO on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

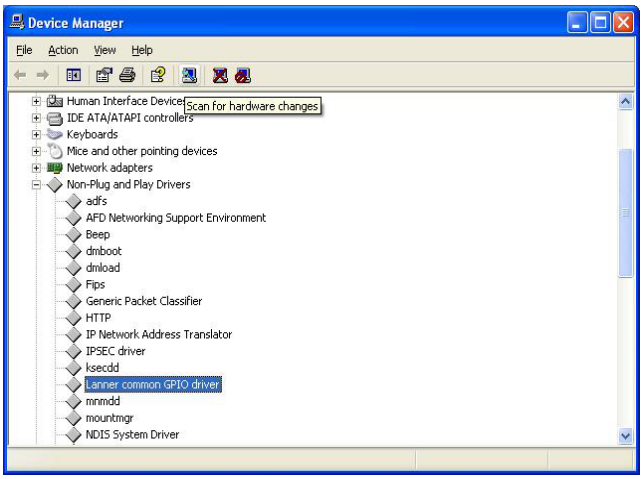
3. The installation process proceeds. Click Close when the process completes.



Appendix B

To verify the GPIO driver installation, do the following steps:

1. Right-click on the My Computer icon, and then select Properties form the menu.
2. Click the Hardware tab, then click the Device Manager button.
3. Select *View* from the menu and select *show hidden devices* .
4. The Lanner common GPIO driver should be listed under the Non-Plug and Play Drivers. If not, click the *San for hardware changes* button from the tool bar.



Executing the Sample Program:

To test the sample program, execute the F81865_test with the appropriate parameters.

DIO:

Usage:

F81865_test DIO_In port_number (reads Digital input port 0, 1, 2 or 3)

F81865_test DIO_Out port_number value (writes Digital output port 0, 1, 2 or 3; For port description, refer to *Jumper Settings* on *Chapter3 Board Layout*)

You can also write your own program by modifying the source code F81865_Test.cpp.. The index address is 2EH.

Appendix G: Terms and Conditions

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:

Improper or inadequate maintenance by the customer Unauthorized modification, misuse, or reversed engineering of the product Operation outside of the environmental specifications for the product.

RMA Service

Requesting a RMA#

6. To obtain a RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
7. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
8. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
9. Mark the RMA# clearly on the box.

Note: Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

Appendix G

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:	Reasons to Return: □ Repair(Please include failure details) □ Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Applied Date:
Return Shipping Address: _____	
Shipping by: □ Air Freight □ Sea □ Express_____ □ Others:_____	

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
03: CMOS Data Lost	09: Cache RMA Problem	15: PS2	21: Shut Down
04: FDC Fail	10: Memory Socket Bad	16: LAN	22: Panel Fail
05: HDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
06: Bad Slot	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date